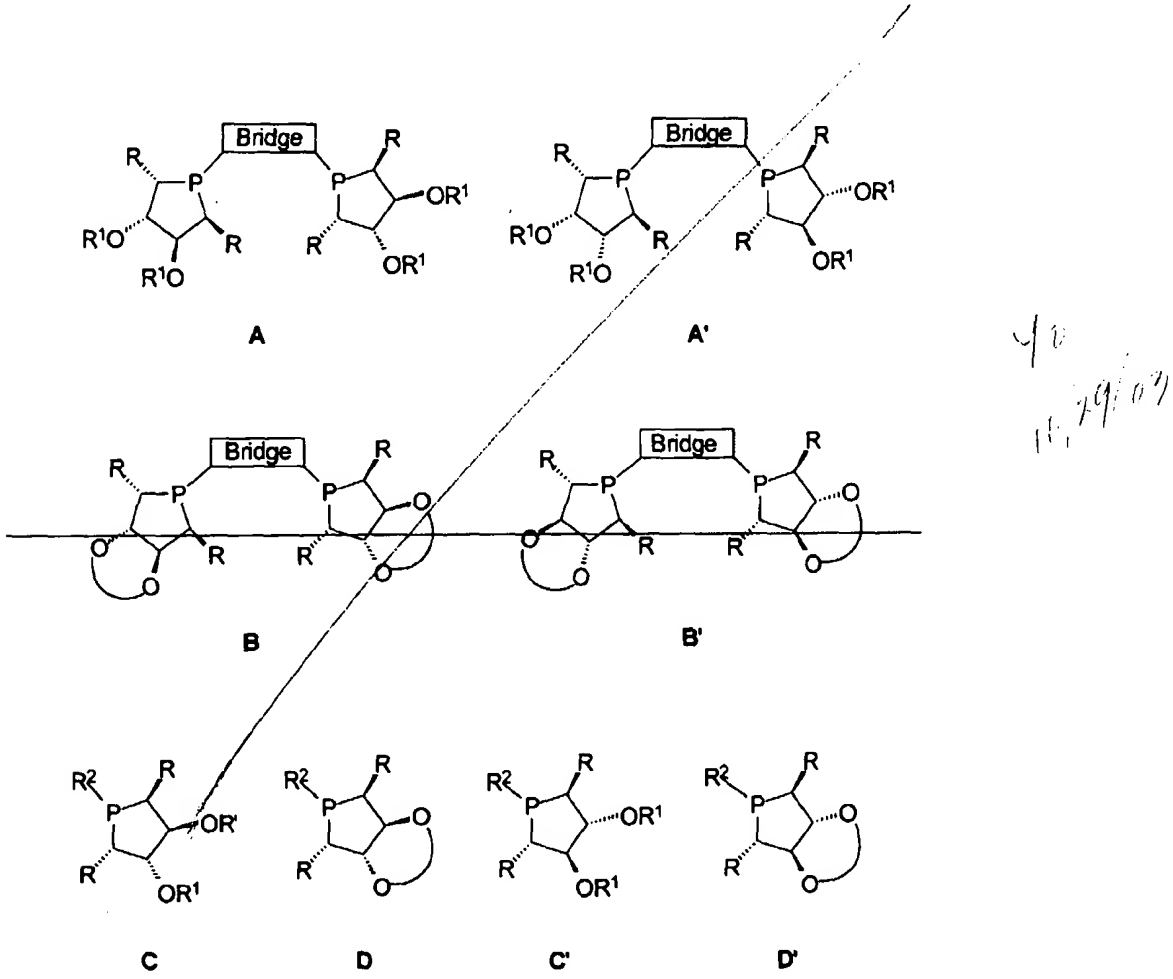
Amendments to the Claim

This listing will replace all prior versions and listings of claims in the application:

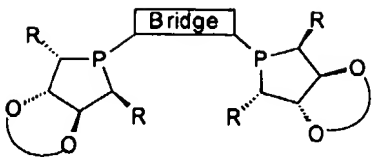
Listing of Claims

Claims 1-22 (withdrawn) → Cancelled 10/24/03 YD

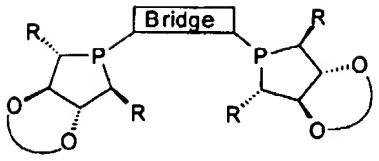
Claim 23. (currently amended) A catalyst comprising a chiral compound in the form of a complex with a transition metal wherein said compound is ~~selected from compounds~~ represented by the formula B, B', D, D' or the corresponding enantiomers:



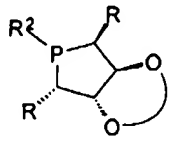
YD 10/29/03



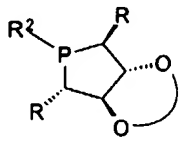
B



B'



D



D'

---

wherein:

a) R and R^2 are independently aryl, alkyl, alkyl aryl, aryl alkyl, or chiral oxazolino which may be substituted with carboxylic acid, alkoxy, hydroxy, alkylthio, thiol or dialkylamino groups;

b) ~~R^1 can be H, alkyl, silane, aryl, a water soluble unit, or a linked polymer chain or inorganic support; and~~ the ring component O O represents a protected diol, a crown ether linkage, -O-alkyl-O- wherein the alkyl group is linked to a polymer, or $-O-(CH_2CH_2-O)_n-$ wherein n is an integer ranging from 1 to 8 and the methylene groups are optionally substituted by C1-C8 alkyl;

c) in formulas B and B', the Bridge may be:

$-(CH_2)_n-$ where n is an integer ranging from 1 to 8;

$-(CH_2)_nX(CH_2)_m-$ wherein n and m are each integers, the same or different, ranging from 1 to 8, and X is O, S, NR^4, PR^4, AsR^4, SbR^4, divalent aryl, divalent fused aryl, divalent 5-membered ring heterocyclic group, or divalent fused heterocyclic group, wherein R^4 is aryl, alkyl, substituted aryl, or substituted alkyl; or

1,2-divalent phenyl, 2,2'-divalent 1,1'biphenyl or 2,2'-divalent 1,2'-binapthyl or ferrocene, each of which may be substituted with aryl, C1-C8 alkyl, F, Cl, Br, I, $COOR^5$, SO_3R^5, $PO_3R^5_2$, OR^5, SR^5, NR^5_2, PR^5_2, AsR^5_2, or SbR^5_2;

wherein the substitution on 1,2-divalent phenyl, the ferrocene or biaryl bridge can be independently halogen, alkyl, alkoxyl, aryl, aryloxy, nitro, amino, vinyl, substituted vinyl, alkynyl, or sulfonic acids; and

R^5 is ~~hydrogen,~~ C1-C8 alkyl, C1-C8 fluoroalkyl, or C1-C8 perfluoroalkyl, aryl; substituted aryl; arylalkyl; ring-substituted arylalkyl; or $-CR^3_2(CR^3_2)_qX(CR^3_2)_pR^1$ wherein q and p are integers, the same or different, ranging from 1 to 8; R^3 is aryl, alkyl, substituted aryl, or substituted alkyl; and X is as defined above.

Claim 24. (original) A catalyst according to claim 23, wherein the transition metal is rhodium, iridium, ruthenium, nickel, or palladium.

Claim 25. (currently amended) A catalyst according to claim 24, wherein said transition metal complex is formed from a compound ~~is a complex with a compound~~ selected from the group consisting of: $Pd_2(DBA)_3$, $Pd(OAc)_2$; $[Rh(COD)Cl]_2$, $[Rh(COD)_2]X$, $Rh(acac)(CO)_2$; $RuCl_2(COD)$, $Ru(COD)(methylallyl)_2$, $Ru(Ar)Cl_2$, wherein Ar is an aryl group, unsubstituted or substituted with an alkyl group; $[Ir(COD)Cl]_2$, $[Ir(COD)_2]X$; and Ni(allyl)X; wherein X is a counterion.

Claim 26. (original) A catalyst according to claim 25, wherein X is selected from the group consisting of: $F1^-$, $C1^-$, Br^-, I^-, BF_4^-, ClO_4^-, SbF_6^-, $CF_3SO_3^-$, and PF_6^-.

Claim 27. (original) A catalyst according to claim 26 wherein X is PF_6^-.

Claim 28. (original) A catalyst according to claim 24 wherein the transition metal is Ru or Rh.

Claim 29. (original) A catalyst according to claim 28 wherein the transition metal is Rh.

Claim 30. (currently amended) A catalyst according to claim 23, wherein said transition metal complex is formed from a compound selected from the group consisting of: ~~the catalyst comprises:~~ $Ru(RCOO)_2$(diphosphine), RuX_2(diphosphine), $Ru(methylallyl)_2$(diphosphine), Ru(aryl group)X_2(diphosphine), $Rh(RCOO)_2$(diphosphine), RhX_2(diphosphine), $Rh(methylallyl)_2$ diphosphine, or Rh(aryl group)X_2 (diphosphine) and X is halogen.

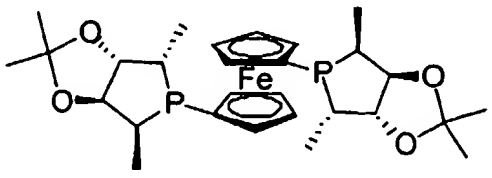
Claim 31. (canceled)

Claim 32. (canceled)

Claim 33. (canceled).

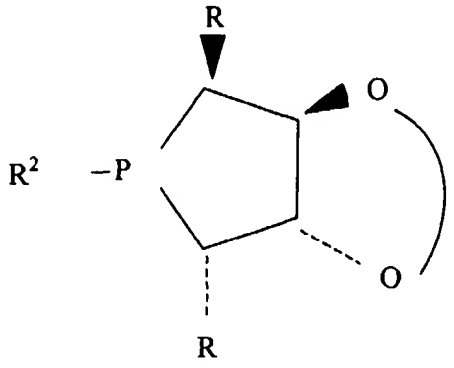
Claim 34. (canceled)

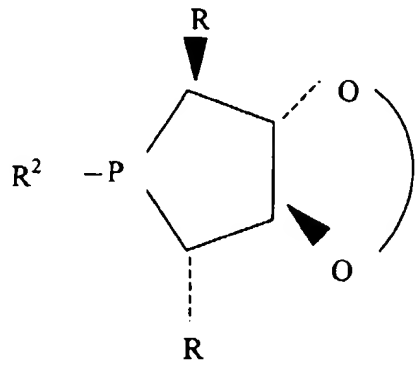
Claim 35. (Previously presented) A catalyst according to claim 23, wherein said chiral compound is represented by the following formula:



24 f-ketalPhos

Claim 36. (currently amended) A catalyst ~~according to claim 23~~ comprising a transition metal complex of a compound of the following formula or its enantiomer:





wherein

A) R is C_1-C_8 alkyl, C_1-C_8 alkyl aryl, aryl C_1-C_8 alkyl, aryl, each of which may be substituted with carboxylic acid, alkoxy, hydroxy, alkylthio, thiol, dialkylamino, diphenylphosphino or chiral oxazoline; and

B) the ring component O⌒O represents a protected diol, a crown ether linkage, -O-C_1-C_8 alkyl-O- wherein the alkyl group is linked to a polymer, –O-$(CH_2CH_2)_n$-O- wherein n is an integer ranging from 1 to 8 and the methylene groups are optionally substituted by C_1-C_8 alkyl, or O-W-O, where W is BR^9, POR^9, PO(OR^9), SO_2, CO, or $Si(R^9)_2$;
where R^9 is C_1-C_8 alkyl, aryl, C_1-C_8 alkyl aryl, or aryl C_1-C_8 alkyl, alkoxy, hydroxy, alkylthio, thio, alkylamino, dialkylamino; and

C) R^2 is either R, H, phenyl or a symmetrical bidentate structure having the formula

BRIDGE —— Z

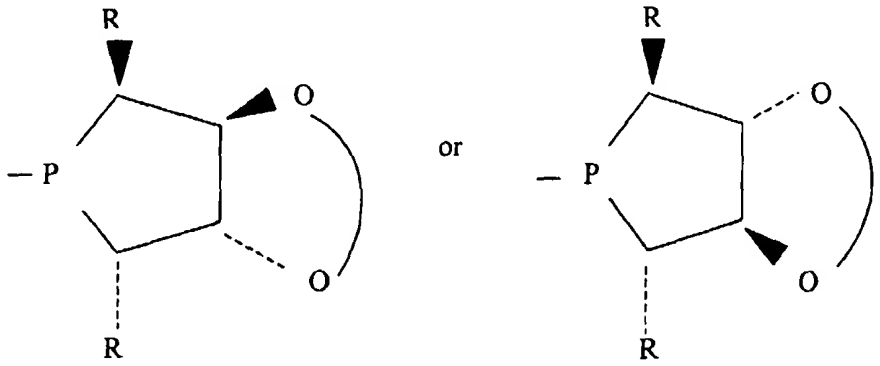
wherein BRIDGE is

i) $-(CH_2)_n-$ where n is an integer from 1 to 8; or

ii) $-(CH_2)_n X (CH_2)_m-$ where n and m are the same or different integers from 1 to 8, and X is O, S, NR^4, PR^4, AsR^4, SbR^4, divalent aryl, divalent fused aryl, divalent 5-membered heterocyclic ring, or divalent fused heterocyclic ring, where R^4 is C^1-C^8 alkyl, aryl, substituted aryl, or substituted alkyl; or

iii) 1, 2-divalent phenyl, 2, 2'-divalent 1, 1'biphenyl, 2,2'-divalent, 1,1' binapthyl, or ferrocene, each of which may be substituted independently with $C_1 - C_8$ alkyl or aryl, F, Cl, Br, I, $COOR^5$, SO_3R^5, $PO_3R^5{}_2$, OR^5, SR^5, $NR^5{}_2$, $PR^5{}_2$, $AsR^5{}_2$, $SbR^5{}_2$, nitro, vinyl, substituted vinyl, alkynyl wherein R^5 is H, C_1-C_8 alkyl, substituted C_1-C_8 alkyl, C_1-C_8 fluoroalkyl, C_1-C_8 perfluoroalkyl, aryl or substituted aryl; and

wherein Z is a compound selected from the group of compounds having the following formulas and their corresponding enantiomers:



Claims 37-42 (withdrawn) ⟹ cancelled 7u 12/29/03

Claim 43. (new) A catalyst according to claim 36, wherein the transition metal is rhodium, iridium, ruthenium, nickel, or palladium.

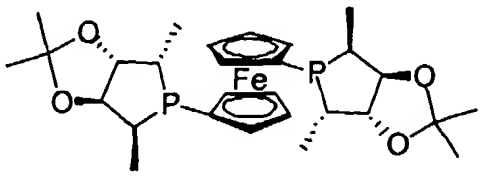
Claim 44. (new) A catalyst according to claim 36, wherein said transition metal complex is formed from a compound selected from the group consisting of:

$Pd_2(DBA)_3$, $Pd(OAc)_2$; $[Rh(COD)Cl]_2$, $[Rh(COD)_2]X$, $Rh(acac)(CO)_2$; $RuCl_2(COD)$, $Ru(COD)(methylallyl)_2$, $Ru(Ar)Cl_2$, wherein Ar is an aryl group, unsubstituted or substituted with an alkyl group; $[Ir(COD)Cl]_2$, $[Ir(COD)_2]X$; and Ni(allyl)X; wherein X is a counterion selected from the group consisting of: Fl^-, Cl^-, Br^-, I^-, BF_4^-, ClO_4^-, SbF_6^-, $CF_3SO_3^-$, and PF_6^-.

Claim 45. (new) A catalyst according to claim 36, wherein said transition metal complex is formed from a compound selected from the group consisting of:

$Ru(RCOO)_2$(diphosphine), RuX_2(diphosphine), $Ru(methylallyl)_2$(diphosphine), $Ru(aryl\ group)X_2$(diphosphine), $Rh(RCOO)_2$(diphosphine), RhX_2(diphosphine), $Rh(methylallyl)_2$ diphosphine, or $Rh(aryl\ group)X_2$ (diphosphine) and X is halogen.

Claim 46. (new) A catalyst according to claim 36, wherein said compound is represented by the following formula:



24 f-ketalPhos

wherein said transition metal is rhodium, iridium, ruthenium, nickel or palladium; and wherein said transition metal complex is formed from: $Pd_2(DBA)_3$, $Pd(OAc)_2$; $[Rh(COD)Cl]_2$, $[Rh(COD)_2]X$, $Rh(acac)(CO)_2$; $RuCl_2(COD)$, $Ru(COD)(methylallyl)_2$, $Ru(Ar)Cl_2$ wherein Ar is an aryl group unsubstituted or substituted with an alkyl group, $[Ir(COD)Cl]_2$, $[Ir(COD)_2]X$ or Ni(allyl)X, wherein X is a counterion selected from the group consisting of: Fl^-, Cl^-, Br^-, I^-, BF_4^-, ClO_4^-, SbF_6^-, $CF_3SO_3^-$, and PF_6^-; or $Ru(RCOO)_2$(diphosphine), RuX_2(diphosphine), $Ru(methylallyl)_2$(diphosphine), Ru(aryl group)X_2(diphosphine), $Rh(RCOO)_2$(diphosphine), RhX_2(diphosphine), $Rh(methylallyl)_2$ diphosphine or Rh(aryl group)X_2 (diphosphine), wherein X is halogen.